An Account of two Books.

I. *A CONTINUATION of NEW EXPERIMENTS Phyſico-Mechanical, touching the SPRING and WEIGHT of the AIR, and their Effects; the* 1. *PART, &c. by the Honourable* ROBERT BOYLE, *Fellow of the* Royal Society, Oxford *1668 in* 4°.

THe Illuſtrious Author of this Book hath therein afreſh furniſht the Philoſophical World, with a ſet of very material and pregnant Experiments (to the number of 50.) which are *partly* improvements of the former of this Nature, *partly*, (and thoſe far more numerous) ſuperadded *new* ones: concerning which, He declareth, that in great part he aimed thereby to ſhew, that theſe very *Phænomena*, which the School-Philoſophers urge, as clear proofs of Nature's Abhorrency of a *Vacuum*, may be not only explicated, but actually exhibited, ſome by the *Gravity*, and ſome alſo by the bare *ſpring* of the Air; which latter he now mentions as a diſtinct thing from the other, not as if it were actually ſeparated in theſe Tryals (ſince the *Weight* of the upper parts of the Air does, as 'twere, bend the *Springs* of the lower) but becauſe that having in the formerly publiſht experiments, and even in ſome of *theſe*, manifeſted the efficacy of the Air's Gravitation on Bodies, he thought fit to make it his task in many of theſe, to ſhew, that moſt of the ſame things, that are done by the Preſſure of *all* the ſuper-incumbent Atmoſphere acting as a *Weight*, may be likewiſe perform'd by the Preſſure of a ſmall *portion* of Air, included indeed, but (without any new Compreſſion) acting as a *Spring*.

The Experiments themſelves, contain'd in this Book, are ſtill of that ſort, which need but a ſhort abſence of the Air; there being another ſort, which require, that the Air ſhould be kept out for a conſiderable time from the Bodies, whereon the trial is made; concerning which latter, the Author ſtill gives the *Reader* hopes of preſenting him in due time with ſuch as may not be unacceptable to him. The Experiments of this *Part* are;

1. About the raiſing of *Mercury* to a great height in an open Tube, by the Spring of a little included Air; wherein 'tis diſcours'd, how this Experiment may be made uſe of againſt thoſe, who in the explication of the *Torricell.* Experiment recurr to a *Funiculus*, or a *Fuga Vacui*.

2. Sheweth, that much included Air rais'd *Mercury* in an open Tube no higher, than the weight of the *Atmoſphere* may in a *Baroſcope*: where notice is taken of the great force of the Spring of the Air then when it could not raiſe the *Mercury* any higher.

3. Sheweth, that ye Spring of the included Air will raiſe *Mercury* to almoſt equal heights in very unequal Tubes; where the reaſon is added, why this and the former Experiment were not tried in *Water*; as alſo an Account of an adventitious Spring, that was ſuper-added to the Air by Heat.

4. About a New Hydraulo-pneumatical Fountain, made by the Spring of un-compreſſed Air; together with the uſes to be made of it, as in Hydraulo-pneumaticks, or to ſhew, by what degrees the Air reſtores its ſelf to its Spring; or eſpecially to find, what kind of Line the Salient water deſcribes in rarify'd Air.

5. About a way of ſpeedily breaking flat Glaſſes by the weight of the *Atmoſphere*.

6. Sheweth, that the breaking of Glaſs-plates in the foregoing experiment need not to be imputed to the *Fuga Vacui*.

7. About a convenient way of breaking blown Bladders by the Spring of the Air included in them: and of the uſefulneſs of this Experiment in other tryals.

8. About the lifting up a conſiderable weight by the bare Spring of a little Air included in a Bladder. Which as 'tis a ſurpriſing experiment, ſo it ſeems not unſerviceable for the explaining of the motion of the Muſcles.

9. About the breaking of Hermetically ſeal'd Bubbles of Glaſs by the bare Spring of their own Air; with an obſervation, that they broke not preſently, and what the reaſon might be of the ſlowneſs of that effect.

10. Contains two or three trials of the force in the Spring of our Air uncompreſs'd, upon ſtable and even ſolid Bodies, whereto 'tis external.

11. Shews, that *Mercury* will in Tubes be rais'd by Suction no higher than the weight of the Atmoſphere is able to impell it up: where the Principle of a *Fuga Vacui*, and that of a *Funiculus* are ſhewn to be inſufficient.

12. About the different heights, whereto Liquors will be rais'd by Suction, according to their ſeveral ſpecifick Gravities: accompanied with a remark, that the proportion of the weight of *Mercury* to *Water* is not quite as 14 to 1.; as alſo, that the no-

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tion of a *Fuga Vacui* is unreaſonable; together with the uſe that may be made of this Experiment in the eſtimating the gravity of ſeveral Liquors, with ſome tryals thereupon.

13. About the Heights, to which *Water* and *Mercury* may be rais'd, proportionably to their ſpecifick Gravities, by the Spring of the Air.

14. About the Heights anſwerable to their reſpective *Gravities*, to which *Mercury* and *Water* will ſubſide, upon the withdrawing of the Spring of the Air.

15. About the greateſt height to which Water can be rais'd by Attraction: where the height of the Water is compar'd to that of the Quickſilver at the ſame time in a *Baroſcope*, and examined according to the proportion of their ſpecifick Gravities; together with a reflexion on a miſtake in the common Writers of Hydraulicks, having a conceit of carrying Water over never ſo high Mountains.

16. About the bending of a Springy Body in the exhauſted Receiver: no alteration of the Spring diſcover'd.

17. About the making of Mercurial and other *Gages*, whereby to eſtimate how the Receiver is exhauſted: of which Gages one is preferr'd and deſcribed.

18. Concerning an eaſie way to make the Preſſure of the Air ſenſible to the Touch of thoſe that doubt of it.

19. About the Subſidence of Mercury in the Tube of the Torricell. Experiment to the Levell of the Stagnant Mercury; accompanied with ſome confirmations of what had been ſaid in the firſt Treatiſe of the Phyſico-Mechanical Experiments.

20. Shewing, that in Tubes open at both ends, when no *Fuga Vacui* can be pretended, the weight of water will raiſe Quickſilver no higher in *ſlender* than in *larger* Pipes.

21. Of the Heights, at which pure Mercury, and Mercury amalgam'd with Tinn, will ſtand in Barometers; together with the uſe that may be made of this experiment, to diſcover how much two mixt bodies penetrate one another; as alſo further to illuſtrate, that the height of the Liquors in the Torricell. Experiment depends upon the *Æquilibrium* with the outward Air.

22. Propoſeth a way of making *Portable* or *Travailing* Barometers; with a particular deſcription of the Figure, ſuch a Barometer is to be of, the way of filling it, putting it into a Frame, and ſecuring it from the harm, the Mercury it ſelf might

do in the tranſportation; where is added the great uſefulneſs of this Inſtrument, with an intimation of others of a different kind, *&c.*

23. Confirms, that Mercury in a Barometer will be kept ſuſpended higher at the top, than at the bottom of a hill: on which occaſion ſomething is noted about the height of Mountains, eſpecially the *Pic* of *Teneriff*, eſteemed to be in its perpendicular height 7 miles, by the more accurate obſervations.

24. Shews, that the Preſſure of the Atmoſphere may be exerciſed enough to keep up the Mercury in the Torricell. experiment, though the Air preſs upon it at a very ſmall orifice.

25. Shews, that an oblique preſſure of the Almoſphere may ſuffice to keep up the Mercury at the uſual height in the Torr. Experiment, and that the Spring of a little included Air may do the ſame; together with the uſe that may be made of the former experiment for a portable Baroſcope.

26. About the making of a *Baroſcope*, that ſerves but at certain times; taking notice of the arguments it affords againſt a *Fuga Vacui*.

27. About the Aſcenſion of Liquors in very ſlender Pipes in an exhauſted Receiver.

28. Touching the great and ſeemingly ſpontaneous Aſcenſion of Water in a Pipe fill'd with a compact Body, whoſe particles are thought incapable of imbibing it: by which is examin'd an Explication, that has been made of the cauſe of *Filtration*. Whence a probable cauſe of the *Aſcenſion of Sap into Trees* is ſuggeſted. An attempt annex'd, to make a Syphon, that ſhould run of it ſelf without Suction.

29. Of the ſeemingly Spontaneous Aſcenſion of Salts along the ſides of Glaſſes; with a conjecture at the cauſe of it.

30. Contains an attempt to meaſure the Gravity of the Cylinders of the Atmoſphere, ſo as that it may be expreſs'd by known and common weights.

31. About the Attractive Vertue of the *Loadſtone* in an exhauſted Receiver.

32. Shews, that when the Preſſure of the External Air is taken off, 'tis very eaſie to drawup the Sucker of a Syringe, though the hole, at which the Air or Water ſhould ſucceed, be ſtopt.

33. About the opening of a Syringe, whoſe Pipe was ſtopt in the exhauſted Receiver, and by the help of it making the Preſſure of the Air lift up a conſiderable weight.

34. Shews

34. Shews, that the Cauſe of the Aſcenſion of Liquors in Syringes is to be deriv'd from the Preſſure of the Air.

35. Shews, that upon the Preſſure of the Air depends the ſticking of Cupping-Glaſſes to the fleſhy parts they are apply'd to.

36. About the making, without heat, a Cupping-Glaſs to lift up a great weight.

37. Shews, that Bellows, whoſe Noſe is very well ſtopt, will open of themſelves, when the Preſſure of the External Air is taken off.

38. About an attempt to examine the Motions and Senſibility of the Carteſian *Materia Subtilis*, with a Pair of Bellows (made of a Bladder) in the exhauſted Receiver.

39. Contains a further attempt to proſecute the Inquiry propos'd in the fore-going Experiment: Firſt with a Syringe and a Feather; then with a Syringe in Water; where 'tis examin'd, if there be an *Æther* or *Materia Subtilis*, what kind of body it muſt be: with a Confirmation of the 34th Experiment.

40. About the falling, in the exhauſted Receiver, of a light Body, fitted to have its motion viſibly varied by a ſmall reſiſtance of the Air: where is mention'd a Deſign to try this way, what the degrees of Celerity would be of deſcending Bodies in an exhauſted Receiver. Directions given, which way to lengthen Receivers for the Trial of this and other Experiments.

41. About the propagation of Sounds in the exhauſted Receiver: Two Trials perform'd by the contrivance deſcribed as neceſſary for this and divers other Experiments: Where alſo is examin'd an aſſertion of *Merſennus*, and a Propoſal of his ſhewn to be unpracticable, *&c.*

42. About the breaking of a Glaſs-drop in an exhauſted Receiver, wherein an *Hypotheſis*, aſcribing the Cauſe of the breaking of them to the force of the External Air, is examin'd.

43. Concerning the Production of Light in the exhauſted Receiver.

44. Touching the Production of a kind of *Halo* and Colours in ſuch a Receiver: The reaſon of it propos'd, with a ſuggeſtion, that the ſame cauſe might have been of that Apparition of Light mention'd in the formerly publiſht Experiments.

45. About the Production of Heat by Attrition in the exhauſted Receiver.

46. About the ſlaking of Quick-Lime in it.

47. Of an attempt made to meaſure the Force of the Spring of included Air, and examine a Conjecture of the difference of its ſtrength in unequally broad-mouth'd Veſſels.

48. About an eaſie way of making a ſmall quantity of included Air raiſe in the exhauſted Receiver 50 or 60 pounds, or a greater weight.

49. Concerning the Weight of Air, and the eſtimating thereof, both by the help of a ſeal'd Bubble, and by weighing the Receiver it ſelf: together with an Advertiſement of the variation of the Gravity of the Air; and that, by Experiments made at different times or places, there are obtain'd different proportions betwixt It and Water.

50. About the disjoyning of two Marbles (not otherwiſe to be pull'd aſunder without a great weight) by with-drawing the Preſſure of the Atmoſphere.

Which Experiments are, where 'twas *neceſſary*, illuſtrated with *Figures*, to the number of 30 in 8 *Plates*.

The whole is concluded with ſome *Notes* and *Trials* about the Atmoſpheres of *Conſiſtent* Bodies (here below) ſhewing, that even *Hard* and *Solid* Bodies (and ſome ſuch, as one would ſcarce ſuſpect) are capable of emitting *Effluvia*, and ſo of having *Atmoſpheres*; which is prov'd firſt *a priori*, both by the *Atomical* and *Carteſian* Hypotheſis; and then demonſtrated by particular Examples in ſeveral Bodies: where, inſtancing in thoſe, that are moſt fixt, the Author examines the Argument of *Des-Cartes* againſt *Electrical* emanations, drawn from the fixedneſs of Glaſs.

Whereunto are ſubjoyned not only ſome Obſervations about the *Electricity* of Bodies, as that of *Amber* by the Sun, and that of Glaſs by the Heat of the Fire; but alſo ſome Conſiderations, that may induce us to believe, that very many other Bodies, not yet diſcover'd to do ſo, emit their *Effluviums*.

II. *HYDROLOGIA CHYMICA, or, The Chymical Anatomy of the SCARBROUGH and other Spaws in YORK-SHIRE*, &c. *by W. SYMPSON.* London, 1668. *in* 8°.

IN this Curious and Experimental Treatiſe the *Reader* will *Firſt* meet with ſome *Animadverſions* upon Dr. *Witties* Tract of the *Scarbrough-Spaw*; our Author affirming, that upon bringing

bringing the ſaid Dr. *Witties* conſtituent Principles of thoſe Waters to the Teſt, he could not find them there; nor, upon a thorow examination of the Vertues aſcribed to them, ſee cauſe to believe them to be ſuch as that *Doctor* affirms; but, after he hath endeavour'd to make it out by ſevere Trials and Obſervations, that the five Ingredients aſſign'd by the ſaid *Doctor*, viz. *Iron*, *Vitriol*, *Allum*, *Niter*, and *Sea-Salt*, are not there, as he layes them down; he declares that he means not to deny them all, but to aſſert thoſe, which he finds there demonſtrable by Experiment; and thereupon affirms, that that, which indeed gives the Eſſence to this *Spaw*, is an acid *Aluminous* Mineral Salt, preying upon and diſſolving a ſlight touch of the Mineral of *Iron*. And having cleared this by Experiment, he proceeds to conſider its Vertues; where, after a ſhort account given of the Original of moſt Diſeaſes, how they ariſe from a vitiating of the ſeveral Ferments, either cauſing a rawneſs, or over-acidity, or other hoſtile qualities in the Nutritive Juyce; he declares, for what Diſeaſes this *Spaw* is proper, and for what not; affirming, that it avails nothing in *Peſtilential Diſeaſes*, *Pleuriſies*, *Poyſons*, *Leproſie*, the *Lues Venerea*, *Morphew*, *Cancer*, *Falling-Sickneſs*, *Apoplexy*, *Palſie*, *Aſthma*; but that its efficacy is moſt diſcernable in the *Scurvy*, *Dropſie*, *Strangury*, or *Stone*, *Jaundice*, *Hypochondriack Melancholy*, *Cachexies*, and *Womens Diſeaſes* proceeding from the *Obſtructions* of the *Menſes*: adding, that in the Eſurine Salt of *Allom* are as noble medicinal Vertues to be found, as in any other Mineral ſpecificated Salt whatever; this Salt being, in its firſt Eſſence, volatile and exquiſitely penetrative, forcing its paſſage through the obſtructed Meanders of the bowels, and notably opening the cloſed parts, and thereby reſtoring the blood, and other peculiar ſpirituous Juyces of the *Genus nervoſum*, to their primitive fermental vigor.

Secondly, In the ſame Treatiſe is contain'd a ſhort Deſcription of the Spaws at *Malton* and *Knarsborough*; the *former* of theſe two having, in our *Author*'s opinion, the like ingredients with thoſe of *Scarbrough*, but with a fainter ſpring; the *latter*, imbued only with a ſmall portion of Eſurine acidity, that hath preyed a little upon, and acquired a ſlight touch from the *Mine a* of *Iron*.

Thirdly, He diſcourſes of the *Original* of *Hot Springs* and other Fountains; where having ſhew'd that they come from Mineral Salts; and how thoſe

thoſe Salts, upon the contact of one another, or of Mineral Bodies, are the Efficient cauſes of Heat in thoſe Springs; he thence takes occaſion to teach, How *Artificial Baths* may be made analogical in vertue and operation to the *Natural*; ſhewing withal the efficacy of Hot Springs and Baths, whether Natural or Artificial, in curing moſt of the ſtubborneſt Diſeaſes.

Fourthly, The Author digreſſes to the Vindication of *Chymical Phyſick* deſcribing firſt, what the Chymical Art is; next, endeavoring to remove the reproach laid on it: and laſtly, declaring the great aſſiſtances thereby afforded to Nature, above ordinary Shop-preparations, in order to the Cure of Diſeaſes: From which laſt he takes occaſion to exſpatiate into the praiſe of this Art, upon the account alſo of its great uſefulneſs for improviug Experimental Philoſophy, and for penetrating into the Principles of all Concretes, whether Vegetable, Animal, or Mineral: inſerting withal, by way of digreſſion, his thoughts of an *Univerſal Character*; meaning ſuch an one, which, being known in all parts of the World, ſhould ſignifie the ſame *thing* in all Countreys; ſo that all People skill'd therein ſhould every where read it every one in their own Language.

To all this is annex'd an *Appendix* concerning the *Original* of *Springs* in *general*, in which the Author admits, that Rain-and-Snow-waters are indeed the proximate Cauſe of all Land-Springs and ſudden Floods, filling the Poroſities and Channels of the Earth's ſurface, and that the remaining part reſtagnats, till it meet with convenient Currents out of Brooks and Ditches into other Rivolets, and thoſe again, by further paſſages, ſwell into Rivers, and thereby cauſe Inundations of low grounds, till thoſe Rivers empty themſelves, by other intermediate ones, into the Sea it ſelf: But that the ſame ſhould be the cauſe of the *Fontes Perennes*, or Living Springs, he poſitively denies; advancing this *Theſis*, That there is a *Circulation of Water* in the *Terraqueous Globe*, as requiſite to its well-being, as the *Circulation of Blood* in *Animals*, whereby the water, through ſubterraneous Channels along the *Sabulum bulliens*, runs from Sea to Sea, and alſo from the Sea to the Heads of Springs, and from them into Rivolets, and thoſe into Rivers, and thence into the Ocean, and ſo circulates round: which, *he ſaith*, includes alſo another Circle of Rain and Snow, which firſt ariſing by Exhalations from the Sea and Earth, are carried down again upon the Earth and Sea, and joyning iſſue with Rivolets from Springs, do ſwell Rivers, which again diſcharge themſelves into the Sea.

Laſtly, The Author concludes, *firſt*, with an account he gives of a *Ternary* of *Medicines* uſed by himſelf, for curing many Diſeaſes; *viz.* 1. *Cathartick*, or Solutive; 2. *Cordial*, or expelling of Wind; 3. *Diaphoretick*, or Sweating. The *firſt* he calls *Scorbutick* Pills; the *ſecond*, *Elixir Proprietatis*, or *Cordial Elixir*; the *third*, *Diaphoretick*, or *Sweating Pills*. Which three Preparations, *he ſaith*, are compoſed of the beſt Vegetables, extracted by Salts, that are graduated to the higheſt pitch; experienced by himſelf to be both ſafe and effectual in the cure of Diſeaſes. *Secondly*, with a Deſcription of the *Eſſence*, as he calls it, of *Scarbrough Spaw*; which he maketh to be the remainder after divers fabulous ſeparations; *viz.* a kind of *Alumino-nitrous* Salt, which, being duly order'd, ſhoots into long *Chriſtalline Stiria's*, and branches it ſelf forth in curious ſhapes in the bottom of the Glaſs, expoſed to a *Balneum Mariæ*.

Errat. N° 41. p. 826. l. 21. r. *ut fiant*, ib. l. 30. r. *augentur*, p. 827. l. 23 r. *Tellure*, ib. l ult. r. *quid*, p. 832. l. 35. r. *notanda*.

Errat. N° 42. p. 838. l. 15. r. *proceed in*, p. 844. l. 17. r. *albuginea*, ib. l. 29. r. *videre eſt*.

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